CLAIMS

1. Method for producing a connector element for connecting frame parts at a joint location in a bicycle framework,

wherein it comprises the following steps:

- arranging an expandable core,
- applying a number of layers of structural fibre fabric incorporated in a plastic material matrix around the core, to form a layered body, of predetermined shape and thickness,
- arranging the core with the layered body in the cavity of a mould,
- increasing the temperature of the mould to a value sufficient to cause the reticulation of the plastic material matrix,
- expanding the core, so as to apply a pressure on the body inside the mould
- removing the body from the mould and removing the core from the body, so as to obtain a hollow body formed of a single piece of structural fibre based material.

2. Method according to claim 1, wherein the increase of temperature of the mould and the expansion of the core occur substantially

simultaneously.

3. Method according to claim 1, wherein a cooling phase is provided before removal of the tubular body from the mould.

4. Method according to claim 1, wherein said structural fibres are selected among: carbon fibres, glass fibres, Kevlar fibres, or any combinations thereof.

5. Method according to claim 1, wherein said plastic material matrix is a thermosetting plastic material matrix.

6. Method according to claim 1, wherein said temperature is comprised in the range from 80°C to 200°C.

7. Method according to claim 6, wherein said temperature is maintained for a time comprised in the range from 10 minutes to three hours.

8. Method according to claim 7, wherein said temperature is maintained for a time comprised in

the range from 30 minutes to three hours.

9. Method according to claim 1, wherein the expandable core includes a body of metal material covered with a deformable sheath made of an elastomeric material, the expansion of the core being obtained through the dilation of the material forming the sheath when the temperature of the mould is increased.

10. Method according to claim 9, wherein the elastomeric material forming the aforesaid sheath has a thermal dilation coefficient exceeding 15×10^{-5} mm/°C and a maximum continuous heat resistance temperature exceeding 100°C.

11. Method according to claim 10, wherein the material forming the core is a synthetic rubber of the type marketed under the trademark AIRCAST 3700 by Airtech International Inc., Huntington Beach, California, USA.

12. Method according to claim 9, wherein the body of metal material comprises a main cylindrical portion and one or more auxiliary

cylindrical branches extending from the main portion and removably connected thereto.

13. Method according to claim 12, wherein the branches are removably connected to the main portion of the metal body by means of screws.

14. Method according to claim 13, wherein each auxiliary branch of the metal body is fastened to the main portion of the core by means of a screw along the axis of the auxiliary branch through a hole of said branch engaging a threaded hole in the main portion.

15. Method according to claim 14, wherein the head of each fastening screw is received in a cavity made in the end surface of the respective branch of the metal body, so that said head does not project from said end surface.

16. Method according to claim 15, wherein the head of each screw presents a hexagonal recess for engagement of a tool.

17. Method according to claim 12, wherein said sheath presents a hollow shape corresponding to that of the metal body, comprising a main

tubular portion and one ore more auxiliary tubular branches, extending from the main portion.

18. Method according to claim 17, wherein the sheath is preferably dimensioned so that it can be applied on the core by slightly stretching it so that the sheath adheres to the core by effect of its elasticity.

19. Method according to claim 17, wherein after removal of the body from the mould, the core of metal material is separated from the body, leaving the sheath inside the body, whereupon the sheath is removed from inside the body.

20. Method according to claim 1, wherein the layers of fabric on the expandable core are defined by one or more windings of at least one strip of fabric around the core.

21. Method according to claim 1, wherein the expandable core comprises a main cylindrical portion and one or more auxiliary cylindrical branches extending from the main portion, and in that the layers of fabric are defined by at least

one strip wound continuously around the core so as to cover completely the main portion and the branches of the core.

22. Method according to claim 21, wherein the layers of fabric further comprise one or more additional plies, each presenting a hole, which are applied in the area of the main portion of the core from which an auxiliary branch departs, said branch passing through the hole of the respective ply.

23. Method according to claim 21, wherein the layers of fabric further comprise one or more additional strips wound around the ends of one or more portions of the expandable core in order to provide enlarged diameter and increased thickness at selected locations.

24. Method according to claim 1, wherein the expandable core is made of a synthetic material presenting a thermal dilatation coefficient exceeding $5x10^{-15}$ mm/°C and a maximum continuous heat resistance equal to at least 80°C, the expansion of the core being obtained through the

dilation of the material forming the core when the temperature of the mould is increased.

25. Method according to claim 24, wherein the core has a thermal dilation coefficient exceeding $9x10^{-5}$ mm/°C and a maximum continuous heat resistance temperature exceeding 100°C.

26. Method according to claim 25, wherein the material forming the core is either PTFE, or PCTFE, or PVDF, or PE-HD.

27. Method according to claim 26, wherein the material forming the core is PTFE.

28. Method according to claim 1, wherein said core consists of a number of separate elements, in order to allow for the separation of the core from the hollow body after extraction from the mould.

29. Method according to claim 1, wherein the expandable core includes a body of metal material including a number of separate sectors, the expansion of the core being obtained through a radially outward movement of said sectors.

30. Method according to any of the previous claims wherein said mould and said core are shaped and arranged in order to produce a connector element defining a bicycle bottom bracket with associated tubular extensions for connection to bicycle frame tubes converging towards the bottom bracket.

31. Method according to any of claims 1-29, wherein mould and said core are shaped and arranged in order to produce a connector element for connection of bicycle frame tubes at any of the joint locations of a bicycle frame where the frame tubes converge towards each other.

32. Connector element for connecting frame parts at a joint location in a bicycle framework, wherein it is obtained with a method according to any of the previous claims.

33. Connector element as in claim 32, wherein the connector element defines a bicycle bottom bracket with associated tubular extensions for connection to bicycle frame tubes converging

towards the bottom bracket.

34. Connector element as in claim 32, wherein the connector element is designed for connection of bicycle frame tubes at a joint location of a bicycle frame where the frame tubes converge towards each other.

35. Connector element according to claim 33, wherein its body presents a main tubular cylindrical portion, defining the bottom bracket of the bicycle, and a plurality of tubular branches, which depart from the main portion, and which are to be connected to the tubular elements of the bicycle frame converging towards the bottom bracket.

36. Connector element according to claim 34, wherein its body presents a main tubular cylindrical portion and one or more tubular branches, which depart from the main portion, and which are to be connected to tubular elements of the bicycle frame, the main portion and each branch being of any predetermined diameter and thickness.

37. Connector element according to claim 36, wherein at least one of said main portion and said branches has diameter and/or thickness which vary along the length thereof.

38. Bicycle bottom bracket, wherein it consists of a single piece made of structural fibre based material, preferably carbon fibre material, and incorporates a plurality of tubular branches departing from the bottom bracket, which are to be connected to the tubular elements of the bicycle frame converging towards the bottom bracket.

39. Connector element for connecting frame parts at a joint location in a bicycle framework, wherein it consists of a single piece made of structural fibre based material, preferably carbon fibre material, incorporating a main tubular portion and one or more tubular branches departing from the main portion, which are to be connected to tubular elements of the bicycle frame.

40. Method according to claim 1, wherein the pressure on the tubular body caused by said expanding step is substantially radial.